

R-EMAP: The Application of EMAP Indicators and Designs to Regional and State Monitoring Problems

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Key Words: EMAP, indicators, probability monitoring, R-EMAP

The Environmental Monitoring and Assessment Program (R-EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. The Regional EMAP (R-EMAP) was initiated to test the applicability of the EMAP approach to answer questions about ecological conditions at regional and local scales. Using EMAP's statistical design and indicator concepts, R-EMAP conducts projects at smaller geographic scales and in shorter time frames than the national EMAP program. This 90-minute session will feature an overview of the R-EMAP program, its history, current projects, and future directions; a presentation highlighting a regional-scale application of EMAP indicators and designs; and a presentation featuring a R-EMAP as it has been applied to a state-level monitoring. The session will be moderated by Dr. Brian Hill (R-EMAP National Coordinator).

Confirmed speakers:

The past, present and future of the Regional Environmental Monitoring and Assessment Program (Brian H. Hill, EPA-ORD-NHEERL-MED)

Tentative speakers (2 speakers will be selected from the following):

New York-New Jersey Harbor Assessment (Presenter TBA)

The harbor bordering New York and New Jersey provides two major services, one being an estuarine environmental habitat that provides protection for aquatic flora and fauna, and second being one of the most commercially used harbors in the country. There was no conclusive evidence to support sediment or water column contamination in the harbor back in 1992. In an effort to better define the potential environmental damages associated with the commercial and industrial activity on the harbor, EPA Region 2 in partnership with EPA-ORD, the NY-NJ Harbor Estuary Program, NOAA, and Rutgers University began a sediments assessment and macro invertebrate index to better interpret potential hazards from toxins. This provided a baseline of sediment contamination for the whole harbor. In addition, the study will establish trends in sediment quality over the next 4 years to assist managers in assessing if their best management practices were being effective. Probabilistic design was incorporated into this study to make it cost effective and timely.

Mid-Atlantic Integrated Assessment (Presenter TBA)

In 1997, MAIA and EMAP began a coordinated monitoring effort of the Mid-Atlantic estuaries to respond to the data gaps identified during the development of the “Condition of the Mid-Atlantic Estuaries Report.” The program built upon existing monitoring activities conducted by the National Oceanographic and Atmospheric Administration, the Chesapeake Bay Program, the National Park Service, the Delaware Estuary Program, and the states, using a suite of common core indicators or measurements. Monitoring was conducted in large estuarine systems, large tidal rivers, and small estuarine systems, some of which were intensively sampled. The legacies of the monitoring program are: 1) regional monitoring is institutionalized within existing monitoring programs; and 2) the National Coastal Assessment was based upon the MAIA design and core indicators.

Mercury Studies in Fish Tissue Collected from Lakes in Maine (Presenter TBA)

A collaborative study between EPA ORD, EPA New England, and the State of Maine utilized ORD’s probabilistic site selection process to collect fish samples from lakes across a large spatial distribution throughout the State of Maine to determine tissue concentrations of mercury. The results of this study brought to light the significance of mercury contamination in aquatic biota and the potential related human health effects throughout the region from consumption. There was an initial assumption, when using targeted sampling that certain lakes were deemed pristine and we would have not focused our studies in those particular areas. Using the probabilistic platform, enabled the region to discover the pervasiveness of the mercury contamination problem. This was one of the first studies of this kind and subsequently resulted in the posting of fish consumption health advisories across the region. Future work now needs to be done to delineate trends in this assessment.

Probability-Based Assessment of Wadeable Streams in Wisconsin (Presenter TBA)

A collaborative effort between EPA Region 5, EPA-ORD, and the Wisconsin Department of Natural Resources, this project was designed with three objectives in mind: (1) to determine if targeted, as opposed to random, stream sampling designs provide substantially different physical, chemical, or biological survey data in Wisconsin streams; (2) determine how watershed attributes influence the quality of streams and how the resulting water quality and habitat characteristics influence the biological integrity of streams in Wisconsin, and (3) develop a multi-metric macro-invertebrate index that will provide a better measure of stream health and environmental stressors than the single metric index currently used in Wisconsin. The project strategy is currently being applied to determine the status and trends of stream resources, quantify anthropogenic stressors at the watershed scale, and guide land and stream resource management activities.

Probability-based Monitoring Within Nebraska’s Rotating Basin Assessment (Presenter TBA)

EPA Region 7, EPA-ORD, and the Nebraska Department of Environmental Quality initiated a R-EMAP effort in 1997 that is still ongoing today. The state of Nebraska realized it had an assessment problem because it was negatively biasing its sampling results by targeting a large

portion of its monitoring resources to waters with suspected problems. Because of this targeted monitoring, it was impossible for the state to make an unbiased assessment of the status and or trends of its stream resources for the state's bi-annual water quality ("305b") assessment report. To solve this problem, the state decided that a new monitoring approach was needed and in 1997 began to use a "EMAP-type" probability based sampling design within its rotating basin assessment framework. By employing both the probability-based design and its associated data analyses methods, the state is able to produce unbiased estimates of its stream resources with a known level confidence.

South Florida (Everglades) Ecosystem Assessment Project (Presenter TBA)

This was a collaborative 4 year effort initiated in 1996 between EPA-ORD, EPA Region 4, Florida DEP, South Florida Water Management District, U.S. Geological Survey, U.S. National Parks Service, and the U.S. Fish and Wildlife Service. The study evaluated and assessed the wet and dry season spatial gradients of numerous parameters in water, soil, and biota to help determine the impacts and interactions among stressors (e.g. hydro patterns, eutrophication, habitat alteration, mercury contamination, etc.) and those changes occurring during that specific period of monitoring. The impacts of excess phosphorous from agriculture and the damaging implications of phosphorous on peat beds is well known. The collaborators developed a comprehensive database for a wide range of water, soil and biological indicators to help them assess ecological condition and any changes taking place based on a myriad of monitoring variables. The probabilistic based sampling design allowed an integration of interacting variables across the entire ecosystem which has never been duplicated by any other project to date. With new trend data and consistent continued monitoring, the ability to make statements about specific eco-regions of the everglades under different water management regimes in a timely manner such that detection of changes from adaptive management action is expected.